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EXAMINER

DANIELS, MATTHEW J

ART UNIT	PAPER NUMBER
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1732

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/656,747

Applicant(s)

DANZIK, DENNIS M.

Examiner

Matthew J. Daniels

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-82 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-82 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claims 24 and 51** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, upon which claim 24 depends, the bladder is removed “from the composite structure.” (Page 26, line 21). In the Examiner’s interpretation, it must necessarily be “in” the composite structure to be removed “from” it, and therefore must also necessarily form some portion of the composite that is hollow. Claim 24 therefore appears to contradict an inherent aspect of the production process of Claim 1. The same relationship holds between Claims 51 and 26. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-3, 6, 14, 17-20, 23-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460). **As to Claim 1**, Renaudin teaches a method of molding composite structures comprising:

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providing a female mold defining the size and shape of the outer surface of the composite structure being molded (Figs. 2, 4, 6A), the female mold being openable and closable (Figs. 3,5,7);

with the mold open, disposing reinforcing material and an inflatable bladder in the mold, the reinforcing material being disposed in an amount and location to provide the desired reinforcement in the composite structure being molded, the bladder being configured to be inflatable to provide pressure on materials located between the bladder and the mold (Figs. 2,4,6A);

closing the mold (inherent in Figs. 3, 5, 7);

putting a resin into the mold (7:22-27);

pressurizing the bladder to a first pressure with an incompressible fluid (7:50-55);

curing the resin (9:33-64);

depressurizing the bladder (3:45-50); and

opening the mold and removing the composite structure from the mold and the bladder from the composite structure (inherent in that the product is used for its intended purpose after forming).

Renaudin is silent to a vent adjacent the top of the mold cavity. However, this aspect of the invention would have been prima facie obvious over Renaudin's teaching of zones of reservation (10:1-9) which are placed to eliminate the formation of air bubbles, therefore serving the purpose of a vent. While silent to the orientation, placement on the top would have been an obvious choice to eliminate resin dripping onto the floor. Renaudin additionally teaches the following:

Claim 2: the bladder being depressurized and deflated (3:45-50)

Claim 3: curing with heat (9:30-60)

Claim 6: excess resin being expelled during pressurization (10:1-10).

Claim 14: See 15:10-20

Claims 17 and 18: deflation to a sub atmospheric pressure would have been prima facie obvious over Renaudin's teachings of depressurization (9:50-55) in order to cause separation of the bladder from the part and to assist removal of the bladder from the mandrel during each cycle. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to deflate to a sub-atmospheric pressure in order to cause the bladder to conform to the mandrel to assist part removal.

Claim 19: See 15:10-35

Claim 20: See 15:20-35

Claim 23: See latex (11:40-50)

Claim 24: Renaudin teaches that only a part of the internal surface defines the composite. See Fig. 6A in which the composite (Item 44) does not reach the ends of the female mold, and is therefore defined by only a part of the female mold. Also note rejection of this claim under 35 USC 112, second paragraph, for failing to distinctly set forth what is being claimed.

Claim 25: See Figs. 2-17

3. **Claims 4 and 5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Caplan (USPN 3194705). Renaudin teaches the subject matter of Claim 1 under 35 USC 103(a). As to Claims 4 and 5, Renaudin is silent to the heated medium

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limitation and to water being used as the fluid. However, water would have been an obvious choice as an incompressible fluid. As evidence, the Examiner cites Kojima (USPN 6009913) as evidence only that the method is often referred to as “hydroforming” and commonly uses water. As to the heated medium limitation, Caplan teaches that it is known not only to heat the mold, but to also heat the pressurizing medium (columns 4, 5 and 10). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Caplan into that of Renaudin in order to transmit heat rapidly to the tube to begin the curing process in a practically simultaneous or instantaneous manner (10:35-40).

4. **Claims 7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Newman (USPN 3519520). Renaudin teaches the subject matter of Claim 1 under 35 USC 103(a). As to Claims 7-9, Renaudin is silent to recovering the resin. However, Newman teaches (5:24-49) that it is known to collect excess resin from in a reinforced tubular composite fabrication process, before curing with heat (5:30). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Newman into that of Renaudin, including reuse of excess resin, in order to reduce the amount and cost of the raw materials used in the process.

5. **Claims 10-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Pasch (USPN 3833323). Renaudin teaches the subject matter of Claim 6 under 35 USC 103(a). Renaudin is silent to partial inflation, however, Renaudin teaches a mandrel that renders obvious the partial inflation because it provides a shape around which the

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reinforcement may be arranged (See Figs. 3-17). However, in the alternative, partial inflation followed by full inflation is a well known concept in bladder forming, and is taught by Pasch (1:7-24). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pasch into that of Renaudin in order to allow movement and arrangement of the items in the mold prior to full inflation, and to provide a mandrel for preshaping the reinforcement.

6. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Dykstra (USPN 6322645). Renaudin teaches the subject matter of Claim 1 under 35 USC 103(a). Renaudin is silent to RF energy. However, Dykstra teaches RF energy applied by induction heating (5:1-20). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Dykstra into that of Renaudin in order to allow heating to different degrees at various portions of the tubular blank, allowing thermal processing of various portions differently, thereby tuning the heating process (6:1-31).

7. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Fellman (USPN 4968545). Renaudin teaches the subject matter of Claim 1 under 35 USC 103(a). Renaudin is silent to metal fibers. However, Fellman teaches it is common to form tubular composite articles from thermosetting resin and metal fibers (4:24-31). Additionally, Fellman teaches that it is known to use these fibers interchangeably with glass or carbon fibers, which Renaudin also discloses (15:10-20). It would have been prima facie

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obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Fellman into that of Renaudin in order to provide improved impact resistance, ductility, and strength by use of Fellman's metal fibers.

8. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Reed (USPN 3013584). Renaudin teaches the subject matter of Claim 1 under 35 USC 103(a). Renaudin is silent to wood. However, Reed teaches that it is common to form tubular composite articles from thermosetting resin and wood fiber (4:32-38). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Reed into that of Renaudin in order to decrease the cost of the article by using a scrap or waste material as filler.

9. **Claims 21 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Smith (USPN 5747552). Renaudin teaches the subject matter of Claim 1 under 35 USC 103(a). Renaudin is silent to a gel coat. However, spraying of gel coats on the surface of molds prior to disposing reinforcing materials is well known in the composite arts. One example is Smith, who teaches a gel coat sprayed onto a waxed mold, followed by application of glass fiber. Having the mold of Smith open is a necessary and obvious limitation. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Smith into that of Renaudin in order to improve the appearance of Renaudin's article by providing a desirable surface glitter, or other surface decoration (4:20-38).

10. **Claims 26-30, 33, 41, 44-47, 50-52** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460). **As to Claim 26**, Renaudin teaches a method of molding composite structures comprising:

providing a female mold defining the size and shape of the outer surface of the composite structure being molded (Figs. 2, 4, 6A), the female mold being openable and closable (Figs. 3,5,7);

with the mold open, disposing reinforcing material and an inflatable bladder in the mold, the reinforcing material being disposed in an amount and location to provide the desired reinforcement in the composite structure being molded, the bladder being configured to be inflatable to provide pressure on materials located between the bladder and the mold (Figs. 2,4,6A);

closing the mold (inherent in Figs. 3, 5, 7);

putting a resin into the mold (7:22-27);

pressurizing the bladder to a first pressure with an incompressible fluid (7:50-55);

curing the resin (9:33-64);

depressurizing the bladder (3:45-50); and

opening the mold and removing the composite structure from the mold and the bladder from the composite structure (inherent in that the product is used for its intended purpose after forming).

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Renaudin is silent to a) a vent adjacent the top of the mold cavity, and b) pouring resin into the mold. However, these aspect of the invention would have been prima facie obvious over Renaudin's teachings for the following reasons:

a) Renaudin teaches zones of reservation (10:1-9) which are placed to eliminate the formation of air bubbles, therefore serving the purpose of a vent. While silent to the orientation, placement on the top would have been an obvious choice to eliminate resin dripping onto the floor.

b) Renaudin teaches pre-impregnation of the fibrous material (3:24-35 and 3:50-60), but is silent to pouring the resin into the mold. However, one of ordinary skill would have found it obvious to pour resin directly onto the fibrous materials while in the mold instead of pre-impregnating the fibrous mat of Renaudin.

Claim 27: A hinged mold is an apparatus limitation, which does not materially affect the method. However, one of ordinary skill would have found it obviously desirable to place hinges on Renaudin's mold so that it closed precisely each time, and in order to avoid lifting the top mold.

Claim 28: See Fig. 6A

Claim 29: the bladder being depressurized and deflated (3:45-50)

Claim 30: curing with heat (9:30-60)

Claim 33: Although silent to excess resin poured into the mold, Renaudin teaches excess resin being expelled during pressurization (10:1-10), and excess resin must have necessarily or obviously been present.

Claim 41: See 15:10-20

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Claims 44 and 45: deflation to a sub atmospheric pressure would have been prima facie obvious over Renaudin's teachings of depressurization (9:50-55) in order to cause separation of the bladder from the part and to assist removal of the bladder from the mandrel during each cycle. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to deflate to a sub-atmospheric pressure in order to cause the bladder to conform to the mandrel to assist part removal.

Claim 46: See 15:10-35

Claim 47: See 15:20-35

Claim 50: See latex (11:40-50)

Claim 51: Renaudin teaches that only a part of the internal surface defines the composite. See Fig. 6A in which the composite (Item 44) does not reach the ends of the female mold, and is therefore defined by only a part of the female mold. Also note rejection of this claim under 35 USC 112, second paragraph, for failing to distinctly set forth what is being claimed.

Claim 52: See Figs. 2-17

11. **Claims 31 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Caplan (USPN 3194705). Renaudin teaches the subject matter of Claim 26 under 35 USC 103(a). As to Claims 31 and 32, Renaudin is silent to the heated medium limitation and to water being used as the fluid. However, water would have been an obvious choice as an incompressible fluid. As evidence, the Examiner cites Kojima (USPN 6009913) as evidence only that the method is often referred to as "hydroforming" and commonly uses water. As to the heated medium limitation, Caplan teaches that it is known not only to heat

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the mold, but to also heat the pressurizing medium (columns 4, 5 and 10). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Caplan into that of Renaudin in order to transmit heat rapidly to the tube to begin the curing process in a practically simultaneous or instantaneous manner (10:35-40).

12. **Claims 34-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Newman (USPN 3519520). Renaudin teaches the subject matter of Claim 26 under 35 USC 103(a). As to Claims 34-36, Renaudin is silent to recovering the resin. However, Newman teaches (5:24-49) that it is known to collect excess resin from in a reinforced tubular composite fabrication process, before curing with heat (5:30). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Newman into that of Renaudin, including reuse of excess resin, in order to reduce the amount and cost of the raw materials used in the process.

13. **Claims 37-39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Pasch (USPN 3833323). Renaudin teaches the subject matter of Claim 33 under 35 USC 103(a). Renaudin is silent to partial inflation, however, Renaudin teaches a mandrel that renders obvious the partial inflation because it provides a shape around which the reinforcement may be arranged (See Figs. 3-17). However, in the alternative, partial inflation followed by full inflation is a well known concept in bladder forming, and is taught by Pasch (1:7-24). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pasch into that of Renaudin in order to allow

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movement and arrangement of the items in the mold prior to full inflation, and to provide a mandrel for preshaping the reinforcement.

14. **Claim 40** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Dykstra (USPN 6322645). Renaudin teaches the subject matter of Claim 26 under 35 USC 103(a). Renaudin is silent to RF energy. However, Dykstra teaches RF energy applied by induction heating (5:1-20). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Dykstra into that of Renaudin in order to allow heating to different degrees at various portions of the tubular blank, allowing thermal processing of various portions differently, thereby tuning the heating process (6:1-31).

15. **Claim 42** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Fellman (USPN 4968545). Renaudin teaches the subject matter of Claim 26 under 35 USC 103(a). Renaudin is silent to metal fibers. However, Fellman teaches it is common to form tubular composite articles from thermosetting resin and metal fibers (4:24-31). Additionally, Fellman teaches that it is known to use these fibers interchangeably with glass or carbon fibers, which Renaudin also discloses (15:10-20). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Fellman into that of Renaudin in order to provide improved impact resistance, ductility, and strength by use of Fellman's metal fibers.

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16. **Claim 43** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Reed (USPN 3013584). Renaudin teaches the subject matter of Claim 26 under 35 USC 103(a). Renaudin is silent to wood. However, Reed teaches that it is common to form tubular composite articles from thermosetting resin and wood fiber (4:32-38). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Reed into that of Renaudin in order to decrease the cost of the article by using a scrap or waste material as filler.

17. **Claims 48 and 49** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Smith (USPN 5747552). Renaudin teaches the subject matter of Claim 26 under 35 USC 103(a). Renaudin is silent to a gel coat. However, spraying of gel coats on the surface of molds prior to disposing reinforcing materials is well known in the composite arts. One example is Smith, who teaches a gel coat sprayed onto a waxed mold, followed by application of glass fiber. Having the mold of Smith open is a necessary and obvious limitation. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Smith into that of Renaudin in order to improve the appearance of Renaudin's article by providing a desirable surface glitter, or other surface decoration (4:20-38).

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18. **Claims 53-56, 59, 67-70, 73, 74, 82** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460). As to **Claim 53**, Renaudin teaches a method of molding composite structures comprising:

providing a female mold defining the size and shape of the outer surface of the composite structure being molded (Figs. 2, 4, 6A), the female mold being openable and closable (Figs. 3,5,7);

with the mold open, disposing reinforcing material and an inflatable bladder in the mold, the reinforcing material being disposed in an amount and location to provide the desired reinforcement in the composite structure being molded, the bladder being configured to be inflatable to provide pressure on materials located between the bladder and the mold (Figs. 2,4,6A);

closing the mold (inherent in Figs. 3, 5, 7);

putting a resin into the mold (7:22-27);

pressurizing the bladder to a first pressure with an incompressible fluid (7:50-55);

curing the resin (9:33-64);

depressurizing the bladder (3:45-50); and

opening the mold and removing the composite structure from the mold and the bladder from the composite structure (inherent in that the product is used for its intended purpose after forming).

Renaudin is silent to a) a vent adjacent the top of the mold cavity, b) pouring resin into the mold, and c) a hinged mold. However, these aspect of the invention would have been prima facie obvious over Renaudin's teachings for the following reasons:

a) Renaudin teaches zones of reservation (10:1-9) which are placed to eliminate the formation of air bubbles, therefore serving the purpose of a vent. While silent to the orientation, placement on the top would have been an obvious choice to eliminate resin dripping onto the floor.

b) Renaudin teaches pre-impregnation of the fibrous material (3:24-35 and 3:50-60), but is silent to pouring the resin into the mold. However, one of ordinary skill would have found it obvious to pour resin directly onto the fibrous materials while in the mold instead of pre-impregnating the fibrous mat of Renaudin.

c) A hinged mold is an apparatus limitation, which does not materially affect the method. However, one of ordinary skill would have found it obviously desirable to place hinges on Renaudin's mold so that it closed precisely each time, and in order to avoid lifting the top mold. Renaudin additionally teaches:

Claim 54: See Fig. 6A

Claim 55: the bladder being depressurized and deflated (3:45-50)

Claim 56: curing with heat (9:30-60)

Claim 59: Although silent to excess resin poured into the mold, Renaudin teaches excess resin being expelled during pressurization (10:1-10), and excess resin must have necessarily or obviously been present.

Claim 67: See 15:10-20

Claims 68-70: Renaudin teaches a mold having a cross section which decreases between first and second ends (Fig. 6A, for example). Additionally, Renaudin provides specific teaching to vary the characteristics of the fibrous reinforcement along the length of the article in order to provide particular properties. Providing a greater thickness of reinforcement would have been

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prima facie obvious in view of Renaudin's teachings to vary this characteristic by "Additional sheets" (15:29). Fiber orientation and sheets appears to be a result effective variable, and therefore it would have been prima facie obvious to optimize this characteristic in order to produce torque strength or the desired degree of bending (15:20-35). See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 73 and 74: deflation to a sub atmospheric pressure would have been prima facie obvious over Renaudin's teachings of depressurization (9:50-55) in order to cause separation of the bladder from the part and to assist removal of the bladder from the mandrel during each cycle. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to deflate to a sub-atmospheric pressure in order to cause the bladder to conform to the mandrel to assist part removal.

Claim 82: See latex (11:40-50)

19. **Claims 57 and 58** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Caplan (USPN 3194705). Renaudin teaches the subject matter of Claim 53 under 35 USC 103(a). As to Claims 57 and 58, Renaudin is silent to the heated medium limitation and to water being used as the fluid. However, water would have been an obvious choice as an incompressible fluid. As evidence, the Examiner cites Kojima (USPN 6009913) as evidence only that the method is often referred to as "hydroforming" and commonly uses water. As to the heated medium limitation, Caplan teaches that it is known not only to heat the mold, but to also heat the pressurizing medium (columns 4, 5 and 10). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate

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the method of Caplan into that of Renaudin in order to transmit heat rapidly to the tube to begin the curing process in a practically simultaneous or instantaneous manner (10:35-40).

20. **Claims 60-62** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Newman (USPN 3519520). Renaudin teaches the subject matter of Claim 53 under 35 USC 103(a). As to Claims 60-62, Renaudin is silent to recovering the resin. However, Newman teaches (5:24-49) that it is known to collect excess resin from in a reinforced tubular composite fabrication process, before curing with heat (5:30). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Newman into that of Renaudin, including reuse of excess resin, in order to reduce the amount and cost of the raw materials used in the process.

21. **Claims 63-65** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Pasch (USPN 3833323). Renaudin teaches the subject matter of Claim 59 under 35 USC 103(a). As to Claims 63-65, Renaudin is silent to partial inflation, however, Renaudin teaches a mandrel that renders obvious the partial inflation because it provides a shape around which the reinforcement may be arranged (See Figs. 3-17). However, in the alternative, partial inflation followed by full inflation is a well known concept in bladder forming, and is taught by Pasch (1:7-24). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pasch into that of Renaudin in order to allow movement and arrangement of the items in the mold prior to full inflation, and to provide a mandrel for preshaping the reinforcement.

22. **Claim 66** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Dykstra (USPN 6322645). Renaudin teaches the subject matter of Claim 53 under 35 USC 103(a). Renaudin is silent to RF energy. However, Dykstra teaches RF energy applied by induction heating (5:1-20). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Dykstra into that of Renaudin in order to allow heating to different degrees at various portions of the tubular blank, allowing thermal processing of various portions differently, thereby tuning the heating process (6:1-31).

23. **Claim 71** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Fellman (USPN 4968545). Renaudin teaches the subject matter of Claim 53 under 35 USC 103(a). Renaudin is silent to metal fibers. However, Fellman teaches it is common to form tubular composite articles from thermosetting resin and metal fibers (4:24-31). Additionally, Fellman teaches that it is known to use these fibers interchangeably with glass or carbon fibers, which Renaudin also discloses (15:10-20). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Fellman into that of Renaudin in order to provide improved impact resistance, ductility, and strength by use of Fellman's metal fibers.

24. **Claim 72** is rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Reed (USPN 3013584). Renaudin teaches the subject matter of Claim 53

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under 35 USC 103(a). Renaudin is silent to wood. However, Reed teaches that it is common to form tubular composite articles from thermosetting resin and wood fiber (4:32-38). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Reed into that of Renaudin in order to decrease the cost of the article by using a scrap or waste material as filler.

25. **Claims 75-79** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Nelson (USPN 5534203). Renaudin teaches the subject matter of Claim 53 under 35 USC 103(a). **As to Claims 75 and 76**, Renaudin's teaching in 15:1-35 would have rendered it obvious to provide overlapping sheets in order to ensure the length of the article has reinforcement. However, in the alternative, Nelson also teaches that this aspect is common (Figs. 37 and 38, Item 272 in particular). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Nelson into that of Renaudin in order to form a skin that is smooth and strong, having uniform density, and low voids (25:34-45). Renaudin also teaches that the fabric can vary long the length of the article to produce particular properties (15:1-35). **As to Claim 77**, Renaudin specifically suggests that the characteristics of the mat or additional sheets (15:28-30) be varied to produce particular properties. Providing one end with a heavier mat would have been obvious in view of Renaudin's teachings to vary the fibrous mat. **As to Claims 78 and 79**, Renaudin's mold clearly tapers (Fig. 6A), and renders obvious the tapering and respective sizes claimed.

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26. **Claims 80 and 81** are rejected under 35 U.S.C. 103(a) as being unpatentable over Renaudin (USPN 6071460) in view of Smith (USPN 5747552). Renaudin teaches the subject matter of Claim 53 under 35 USC 103(a). Renaudin is silent to a gel coat. However, spraying of gel coats on the surface of molds prior to disposing reinforcing materials is well known in the composite arts. One example is Smith, who teaches a gel coat sprayed onto a waxed mold, followed by application of glass fiber. Having the mold of Smith open is a necessary and obvious limitation. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Smith into that of Renaudin in order to improve the appearance of Renaudin's article by providing a desirable surface glitter, or other surface decoration (4:20-38).

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Grossman (USPN 5152860) teaches the following on 1:44-56 regarding the interchangeability of prepreg sheets, such as those of Renaudin, with the pouring method of impregnation:

Initially liquid resin was poured onto glass fabric in the design configuration, then spread to impregnate the 45 fabric. The component was placed in a subsequently evacuated bag prior to curing in an autoclave, a labor intensive and expensive procedure. Major cost savings were realized after the development of pre-impregnated fibers with epoxy resin, materials called "prepregs", 50 which have uniformity of resin content and yield uniform properties. Improvements in the prepreg materials have made possible precision curing cycles yielding uniform composites with greatly improved properties along with additional reductions in material and labor 55 costs.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Daniels whose telephone number is (571) 272-2450. The examiner can normally be reached on Monday - Thursday, 7:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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